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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/679,714
Filing Date: October 06, 2003
Appellant(s): AWAD, AZIZ CHAFIC

Ian C. McLeod
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed January 11, 2010 appealing from the Office action mailed August 13, 2009.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

NEW GROUND(S) OF REJECTION

- Claims 1-2, 8-10, 13-14 and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hilton et al. (US 4140801) in view of Christ et al. (US 4242361), "Yeast Growth Medium", "Catalogue of Bacteria & Bacteriophages", Champagnat (US 3193390), Lund (Detection of Microorganisms in Food), "Yeast Media, Solutions and Stocks", Green et al. (US 3891771), Annuk et al. (US 5316776) and Sokolsky (US 1676166) and in further view of Hopkins (US 4341802), Young et al. (US 3886046) and Pinnegar (US 3425839) and in further view of Mottram ("Acrylamide is formed in the Maillard Reaction"), Baldwin (US 2744017) and Elder et al. (US 20040058054).
- Claims 26-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claims 1-2, 8-10, 13-14 and 17-19, above, and in further view of Amrein ("Potential of Acrylamide Formation, Sugars, and Free Asparagine in Potatoes: A comparison of Cultivars and Farming Systems").

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

It is noted that the Final Rejection, mailed August 13, 2009 the rejection heading for the rejection of claim 13 stated,

Claim 13 is rejected under 35 U.S.C. 103(a) as begin unpatentable over the references as applied to claims 1-2, 8-10, 12, 14 and 17-19, above, and in further view of Goering et al. (US 4428967).

In this rejection heading, claim 12 was inadvertently included in the rejection heading. The rejection from which claim 13 depends, states that claims 1-2, 8-10, 13-14 and 17-19 are rejected under 35 U.S.C. 103(a). Thus, the proper rejection heading for claim 13 is as follows,

Claim 13 is rejected under 35 U.S.C. 103(a) as begin unpatentable over the references as applied to claims 1-2, 8-10, 13-14 and 17-19, above, and in further view of Goering et al. (US 4428967).

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

US 4140801	HILTON et al.	8-1979
US 4242361	CHRIST et al.	12-1980
US 3193390	CHAMPAGNAT	7-1965
US 3891771	GREEN et al.	6-1975

US 5316776	ANNUK et al.	5-1994
US 1676166	SOKOLSKY	7-1928
US 4341802	HOPKINS	7-1982
US 3886046	YOUNG et al.	5-1975
US 3425839	PINNEGAR	2-1969
US 4348417	GREUP et al.	9-1982
US 6001409	GIMMLER et al.	12-1999
US 5558898	SUNDERLAND	9-1996
US 2744017	BALDWIN	5-1956
US 20040058054	ELDER et al.	3-2004
US 4428967	GOERING et al.	1-1984
US 4298620	HAGIWARA	11-1981
US 3818109	BECHTLE	6-1974

"Yeast Growth Medium"

<http://www.bio.net/bionet/mm/yeast/1997-December/007601.html>; December 20, 1997

ATCC Catalogue of Bacteria & Bacteriophages, 18th edition, page 176, 415 and 452, 1992

Lund, Barbara, M.; Baird-Parker, Tony C.; Gould, Grahame W. "Microbiological Safety and Quality of Food, Volumes 1-2 (pp. 1761-1780).Springer-Verlag. Online version available at: <http://www.knovel.com/knovel2/Toc.jsp?BookID=946&VerticalID=0>

Mottram, David S. et al. "Acrylamide is formed in the Maillard Reaction." Nature, Vol 419, pages 448-449

"Fermented Fruits and Vegetables, A Global Perspective." FAO Agricultural Services Bulletins - 134, 1998
[Http://www.fao.org/docrep/x0560e/x0560e10.htm](http://www.fao.org/docrep/x0560e/x0560e10.htm)

"Lactic Acid Bacteria", April 20, 2001
<http://web.archive.org/web/20010430203337/http://www.waksmanfoundation.org/labs/ml/lactic.html>

Yeast Fermentation, February 22, 1999
<http://web.archive.org/web/19990222083203/http://spot.colorado.edu/~kompala/lab2.html>

"How to Restart a Stuck Fermentation", September 25, 2001
[Http://web.archive.org/web/20011023115240/www.yobrew.co.uk/stuck.htm](http://web.archive.org/web/20011023115240/www.yobrew.co.uk/stuck.htm)

Amrein, Thomas M. et al., "Potential of Acrylamide Formation, Sugars, and Free Asparagine in Potatoes: A Comparison of Cultivars and Farming Systems." Journal of Agricultural and Food Chemistry 2003, 51, pages 5556-5560

(9) New Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

NEW GROUND(S) OF REJECTION

- **Claims 1-2, 8-10, 13-14 and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hilton et al. (US 4140801) in view of Christ et al. (US 4242361), "Yeast Growth Medium", "Catalogue of Bacteria & Bacteriophages", Champagnat (US 3193390), Lund (Detection of Microorganisms in Food), "Yeast Media, Solutions and Stocks", Green et al. (US 3891771), Annuk et al. (US 5316776) and Sokolsky (US 1676166) and in further view of Hopkins (US 4341802), Young et al. (US 3886046) and Pinnegar (US 3425839) and in further view of Mottram ("Acrylamide is formed in the Maillard Reaction"), Baldwin (US 2744017) and Elder et al. (US 20040058054).**

Regarding claim 1, Hilton et al. teach a process for reducing acrylamide production from a reaction of free asparagine and sugars in a cooked, starch based processed food, such as potatoes, comprising adding a raw uncooked food comprising asparagine and sugars to a fermenter (Column 7, lines 23-33). Hilton et al. further teach using an aqueous medium for fermentation by a microorganism (Column 3, lines

35-43). By fermenting the uncooked potatoes, Hilton et al. teach that the yeast used are "sufficient to lower the reducing sugar content of the potato solids during fermentation to an extent that they have improved resistance to browning during frying (Column 2, lines 39-43). Although Hilton et al. do not specifically discuss the reduction of the formation of acrylamide, the Maillard reaction and its reactants have been well known (i.e. asparagine and reducing sugars) and are inherently present in potato products. By reducing one of the reactants, such as the reducing sugars through fermentation, Hilton et al. intrinsically would have reduced the formation of acrylamide. This would further have been obvious to the ordinarily skilled artisan since Hilton et al. teach that upon frying the potato product has reduced browning and since the Maillard reaction, which results in the browning during frying would have been limited as a result of lowering the amount of one of the reactants. It is further noted that Mottram teaches that acrylamide is formed as a result of the Maillard reaction, which is the reaction that also results in the browning of products, as evidenced by Baldwin (column 1, lines 39-45). Additionally, Elder et al. teaches that fermentation has been a known mechanism for reducing the formation of acrylamide (see paragraph 0011). Thus, the art recognized fermentation for reducing acrylamide formation, which the art also recognized is the result of the Maillard browning reaction. Thus, by fermenting potatoes using a microorganism such as yeast, Hilton would intrinsically have also reduced acrylamide formation, especially since Hilton et al. teach reducing the same reaction that Mottram teaches results in the formation of acrylamide. Thus, applicant's process only essentially differs from Hilton et al. in the concept of recirculation of the aqueous

medium, and the particular pH and additives incorporated into the aqueous medium for controlling fermentation. These differences have been addressed in the rejections below. Hilton et al. teach that other components may be added, such as rice, tapioca or even raw potatoes or other pre-treated potatoes (column 5, line 66 to column 6, line 12). It is noted however that Hilton et al. teach that these are optionally added and thus do not require to be added to the fermented potato product. Therefore, it is noted that Hilton et al. teach wherein no sugar products are added to the potato through the frying step.

Claim 1 differs from Hilton et al. in specifically reciting wherein the aqueous medium comprises yeast extract.

Both "Yeast Growth Medium" and "Catalogue of Bacteria & Bacteriophages" have been relied on to teach that it has been well known in the art to use yeast extract for providing a nutrient medium for the microorganism. For example, on page 415 (#17) and 452 (#1006) of the Catalogue of Bacteria & Bacteriophages, media formulations teaches that yeast extract has been well known to be used in media for growth of bacteria. Additionally, Yeast Growth Medium and Yeast Media, Solutions and Stocks (Page 2 of 6 to 3 of 6) also teach the conventionality of using yeast extract as a growth media for *Saccharomyces* yeast. This is also supported by Champagnat, who teaches using yeast extract in combination with other components to incubate a yeast strain (See column 3, line 37). Lund also provides evidence of the conventionality in using yeast extract as a nutrient components for a microorganism such as yeast (See Page 1765). Furthermore, it has been well known to the ordinarily skilled artisan that yeast

and other microorganisms require nutrients in order to ferment a food. To therefore add yeast extract into the aqueous medium of Hilton et al., would have been obvious to one having ordinary skill in the art for the purpose of increasing the growth of the yeast or bacteria and thus enhancing the ability of the microorganism to ferment the food product.

Regarding the limitation of "the aqueous medium contains the uncooked processed food" it is noted that Hilton et al. already teach employing an aqueous medium comprising a microorganism for the purpose of fermenting and thus consuming the reducing sugar content within the starch based food (i.e. the potato) for the purpose of controlling the Maillard reaction when frying the thus formed potato products. Nevertheless, both Hopkins and Young et al. teach that it was advantageous to recirculate the aqueous medium since the resulting liquor formed during the fermentation comprises the nutrients that can be recycled back into the fermentation to support additional microorganism growth. Although the references to Hopkins, Young et al. and Pinnegar might not directly teach using this recirculation of the aqueous medium for potatoes, it is noted that these references have been relied on to teach providing a recirculation of the aqueous medium for the advantages of improving the fermentation rate. In light of this, to therefore achieve the advantage of improving the fermentation rate, by recirculating the aqueous medium would have been obvious to one having ordinary skill in the art. Additionally, it is noted that Christ et al. also teaches the concept of recirculating a fermentation medium, wherein the medium can be recirculated over any vegetable material (column 3, lines 9-12). Since Hilton et al.

teaches using yeast fermentation, for instance, for lowering the reducing sugar content of a starched based processed food, such as a potato, and since Christ et al. teaches recirculating the fermentation medium for the purpose of ensuring complete contact of the product to be fermented with the fermentation medium, to therefore modify the combination employ an aqueous medium into which the food product is placed would have been obvious to one having ordinary skill in the art, for the purpose of ensuring complete contact between the fermentation medium and the product to be fermented. Nevertheless, Hopkins, Young et al. and Pinnegar teach the added advantage of improving the fermentation rate by employing a recirculation of the aqueous medium. Thus, it is noted that applicant is not the first to recirculate a fermentation medium and the art teaches employing this process for fermenting various types of foodstuffs, as taught by Christ and as further evidenced by Hopkins, Young and Pinnegar. Since Hilton also teaches fermenting a vegetable material to remove the reducing sugars, to therefore employ a recirculation type process would have been obvious to the ordinary skilled artisan for the purpose of achieving the art recognized advantage of complete contact and improved fermentation rates.

Regarding agitation, it is noted that Hilton et al., teach wherein the fermentation microorganism and the food product can be effectively mixed so that the fermentation progresses at a satisfactory rate (Column 2, lines 44-47). To therefore use agitation would have been obvious since the prior art recognized that mixing further facilitates the rate of fermentation. Nevertheless, Annuk et al. (US 5316776) has also been relied on to teach that it has been conventional in the art to use an agitating means for the

purpose of achieving homogeneity in the fermentation (Column 10, lines 52-56). Since Hilton et al. teach mixing and since Annuk et al. teach agitating the mixture to achieve homogeneity in the fermentation, it would have been obvious to one having ordinary skill in the art to agitate the aqueous medium for the purpose of achieving homogeneity in the fermentation.

Claim 1 further differs from the combination in specifically reciting wherein the fermenter further comprises an outlet with a strainer for straining the fermented food and further wherein the aqueous medium is agitated in the fermenter.

Regarding the strainer, it is noted that Christ et al. teach recycling of a fermentation medium which comprises a microorganism (Column 3, lines 29-40). As a result, the food at the top of the fermenter is also rehydrated with the fermentation medium, thus ensuring more uniform fermentation of the entire batch (column 1, line 68 to column 2, line 2 and column 2, lines 5-11). Additionally, Green et al. teaches that the recirculation of an aqueous medium requires that the vessel employ a strainer to support the food, while the aqueous medium is recirculated (Figure 2, item 12 and column 2, lines 65-68). As a result of the screen, the brine is capable of being recirculated while the food is retained in its position within the vessel. Nevertheless, since Christ et al. teach fermenting a food product using a microorganism, and further teach that any vegetable material can be fermented in the apparatus (Column 3, lines 9-12), it would have been obvious to have used a screen or some form of a straining apparatus for the purpose of preventing the food material from being taken up through the recycling stream. To therefore use a strainer to prevent the food of Christ et al. from

being taken up through the recycle stream would have been obvious to one having ordinary skill in the art.

Hopkins, Young and Pinnegar have all been relied on as further evidence that applicant is not the first to recirculate a fermentation medium, with the added advantage of increasing fermentation rates and being able to recycle/reuse the fermentation medium. Hopkins teaches that recirculating of the aqueous medium is beneficial in the fermentation processes since the resulting liquor formed during fermentation comprises the nutrients that can be recycled back into the fermentation to support additional microorganism growth (Column 6, lines 54-68). Similarly, Young et al. teach recycling a fermentation stream for the purpose of increasing fermentation rates by recycling cells as nutrients (for microorganism fermentation) back into the fermenter (see abstract and column 2, lines 60-65 and column 2, line 66 to column 3, line 2) for essentially increasing the fermentation rate. Nevertheless, Hopkins and Young et al. thus teach that recirculating the aqueous medium back into the fermentation tank is clearly advantageous for the purpose of increasing fermentation rates. Additionally, Pinnegar teaches that it was conventional in the art of fermentation to provide a filter within the fermentation vessel, for the purpose of separation a liquid from a solid. On column 4, lines 59-62, Pinnegar also teaches recycling the fermentation liquor. In view of the art taken as a whole, to therefore recirculate the aqueous medium would have been obvious for its art recognized and applicant's intended function. To therefore employ a strainer, as taught by Green et al., would have been obvious to one having ordinary skill in the art, for the purpose of retaining the product to be fermented in place, while the

nutrient liquor is recycled to increase microorganism growth and fermentation rates. Regarding removal of the aqueous medium through the outlet strainer, it is noted that in view of the references to Christ et al., Green, Hopkins, Young and Pinnegar, to thus remove/ recirculated the aqueous medium through the strainer would have been obvious to one having ordinary skill in the art, for the purpose of retaining the product to be fermented in place, while the nutrient liquor is recycled to increase microorganism growth and fermentation rates.

Claim 1 further differs from the combination in specifically reciting wherein the aqueous medium is at a pH between about 4 and 8. The Catalogue of Bacteria & Bacteriophages, for instance teaches that the aqueous media has a pH adjusted to 7 and 6.2 (See page 415 #17 and 452 #1006). These are the conditions for the media that are optimal for the growth of the bacteria strain. To therefore have a pH of between 4 and 8 would have been obvious and routinely determinable for the purpose of achieving the optimal growth conditions for the microorganism. Furthermore, to use a food grade acid to achieve the adjustment to between 4 and 8 would also have been obvious to the ordinarily skilled artisan, since the Catalogue of Bacteria & Bacteriophages (Page 452 #1006) teaches using food grade acids within the aqueous medium. Additionally, Christ et al. (Column 3, lines 37-40) teach using materials to adjust the pH of the solution to the desired level.

Claim 1 further differs from the combination in specifically reciting wherein the food is washed in the fermenter by introducing water to remove residues on the food. Sokolsky has been relied on to teach that after fermentation, a food product contains

residues which would be desired to be washed off (Page 1, lines 31-38). Since Hilton et al. teach that the flavor of the potatoes after frying should have good flavor and other characteristics (Column 6, lines 50-52) it would have been obvious to remove any residual bacteria and fermentation medium that remain on the potato, which would alter the final flavor of the product. This further would have been obvious since Sokolsky teaches that washing a fermented product to remove any residual bacteria has been conventional in the art.

Regarding claim 8, Hilton et al. teach making potato chips and French fries (column 5, lines 46-50). Regarding claim 9, Hilton et al. is silent in teaching recirculating the aqueous medium into and out of the vessel, however, Christ et al. and Green et al., as discussed above, address recirculating the aqueous medium while retaining the food in the fermenter. Regarding claim 10, Hilton et al. teach using yeast.

Regarding claim 13, the combined teachings of Hilton et al., Christ et al., Green, Hopkins, Young and Pinnegar teach recycling the fermentation medium and thus reusing the materials that ferment the product to be fermented. Thus, the art has recognized that fermentation materials can be reused. Therefore, to remove fermented food product and then recycle the microorganism would have been obvious to the ordinarily skilled artisan for the purpose of making a more efficient process.

Regarding claim 14, Hilton et al, in combination with the teachings of the Catalogue of Bacteria and Bacteriophages teaches adjusting the pH of the aqueous medium prior to fermenting. In this case, the media for growing the bacteria has been adjusted.

Regarding claim 17, Hilton et al. teach drying the food after fermentation and before cooking (column 2, lines 19-27).

Claim 18 differs in specifically reciting wherein the water is distilled. The Catalogue of Bacteria & Bacteriophages teaches media for the growth of bacteria wherein distilled water is used (page 415 #17). Even further however, using purified water would have been obvious to the ordinarily skilled artisan to ensure that impurities or other microorganisms which may be present in the water do not contaminate the food and the fermentation process. Since it would have been obvious to the ordinarily skilled artisan that the fermentation media and the nutrients in the media directly affects the fermentation rate, to minimize the impurities by using distilled water would have been obvious.

Regarding claim 19, the combination teaches wherein the uncooked processed food can potato slices, as evidenced by Hilton et al., wherein the uncooked potato slices are subsequently also further processed for fermentation.

- **Claims 4, 11, 12, 16 and 20-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claims 1-2, 8-10, 13-14 and 17-19, above, and in further view of Hagiwara (US 4298620), Bechtle (US 3818109), "Fermented Fruits and Vegetables", Baldwin (US 2744017), applicant's admission of the prior art and "Lactic Acid Bacteria" and in further view of "Yeast Fermentation" and "How To Restart a Stuck Fermentation."**

Hilton et al. teach that the product is fermented in an aqueous medium at 29°C (Column 7, line 30). Claim 4 recites that the pH at the end of the fermentation the aqueous medium for the fermentation has a pH of between about 4 and 5, and thus differs from the combination as applied to claim 1 in this regard.

Hagiwara teaches that in using lactic acid bacteria, a pH of between about 4 and 6 is optimal for initiating the fermentation (column 4, lines 53-60). Hagiwara further teaches that when employing lactic acid bacteria, the pH of the fermentation medium is about 4 (column 4, line 58). Hagiwara thus provides further evidence of the conventionality of the aqueous medium to be acidic such as at a pH of 4, when using lactic acid bacteria, since the result of lactic acid bacterial fermentation is the product of lactic acid, a low pH substance. This is further evidenced by "Lactic Acid Bacteria" who teach that lactic acid bacteria produce lactic acid, which results in the pH dropping to as low as 4 (see background, third paragraph). Therefore, when employing lactic acid, the particular pH of the fermentation medium, at the beginning, during and even the end of the fermentation would have been an obvious result effective variable, routinely determinable by experimentation for the purpose of achieving the desired fermentation. Nevertheless, Hagiwara teaches that lactic acid bacteria optimally perform at a pH of 4 to 6 and result in the pH of the medium being 4 at the end of the fermentation. Bechtel also teaches fermentation using lactic acid bacteria such as lactobacillus, Streptococcus and Leuconostoc (column 5, lines 60-64) and further teach that the fermentation culture at the start of the fermentation medium has been known to be between 4 and 5, such as at 4.9 (Column 7, line 43). Additionally, "Fermented Fruits and Vegetables," teaches

that it has been well known in the art to use lactic acid bacteria for fermentation in the production of sauerkraut (See page 6 of 13, See Section 5.6.2). Since Christ et al. teaches the use of yeast fermentation for producing sauerkraut, "Fermented Fruits and Vegetables" thus teaches that it has been conventional to employ either of yeast or lactic acid bacteria, for the purpose of achieving the desired fermentation of the product. Baldwin has also been cited to teach that it has been known in the art to use lactic acid bacteria for the purpose of reducing "Maillard Type" browning (column 1, lines 27-35 and lines 39-49). Baldwin teaches in the cited column and lines that fermentation using lactic acid bacteria removing naturally occurring glucose. As admitted by applicant on page 2, paragraph 0003, lines 4-5, the use of acid production bacteria cultures for food fermentation is well known. To therefore use lactic acid bacteria, would therefore have been obvious to one having ordinary skill in the art, since the prior art teaches that it has been conventional to ferment foods using lactic acid bacteria, which have also been fermented by using yeast. To therefore maintain this pH would have been obvious to one having ordinary skill in the art for the purpose of controlling the fermentation rate of the bacteria, especially when employing lactic acid bacteria for reducing the Maillard reaction and thus the browning in the food.

Additionally, it is noted that Yeast Fermentation has been relied on as further evidence that the pH is controlled at pH 5 for the purpose of ensuring optimum yeast growth. "How to Restart a Stuck Fermentation" also evidences that in order to achieve optimum fermentation, the pH of the fermentation medium should be controlled to a desired degree. "How to Restart a Stuck Fermentatin" thus teaches a pH for yeast

fermentation of between 3.5-5.5 (page 1). Therefore, when employing organisms such as yeast, the art also recognized controlling the pH throughout the fermentation for the purpose of achieving optimal yeast growth and fermentation. Obviously, the references relied on teach that the pH varies depending on the particular strain of fermenting bacteria/organism and the desired rate of fermentation. Nevertheless, to employ an optimal pH as taught by the references would have been obvious and within the skill of one having ordinary skill in the art, as an obvious result effective variable for achieving the desired fermentation.

Regarding claims 11 and 12, which recite that the microorganism is a bacterium and wherein said microorganism is a lactic acid producing microorganism, it is noted that applicant admits on page 2, paragraph 0003, lines 4-5, that the use of acid production bacteria cultures for food fermentation has been well known. Hagiwara and Bechtle teach already that it has been well known in the art to use lactic acid bacteria for foods. Christ et al., teach using yeast in the fermentation for producing sauerkraut. "Fermented Fruits and Vegetables," also teaches that it has been well known in the art to use lactic acid bacteria for fermentation in the production of sauerkraut (See page 6 of 13, See Section 5.6.2). Baldwin has also been cited to teach that it has been known in the art to use lactic acid bacteria for the purpose of reducing "Maillard Type" browning (column 1, lines 27-35 and lines 39-49). Baldwin teaches in the cited column and lines that fermentation using lactic acid bacteria removing naturally occurring glucose. To therefore use lactic acid bacteria, would therefore have been obvious to one having

ordinary skill in the art, since the prior art teaches that it has been conventional to ferment foods using lactic acid bacteria.

Claim 16 differs from the combination in specifically reciting wherein the pH of the aqueous medium at the end of the fermentation is between about 4 and 5. Hagiwara teaches that by using lactic acid bacteria, at the end of the fermentation the pH of the culture medium is about 4 (Column 4, line 58). Hagiwara provides further evidence of the conventionality, when using lactic acid bacteria, for the aqueous medium to be acidic, such as at a pH of 4, since the result of lactic acid bacterial fermentation is the production of lactic bacteria, a low pH substance. This is further evidenced by "Lactic Acid Bacteria" who teach that lactic acid bacteria product lactic acid, which results in the pH dropping to as low as 4.0 (see background, third paragraph).

Claim 20 is similar to claim 1, with the difference being the particular pH of the aqueous medium being between 4 and 5. It is noted that it would have been obvious to one having ordinary skill in the art to employ this pH range, for the reasons given with respect to claim 4. Claim 21 Hilton et al. teach wherein the cooked product can be potato chips (column 5, lines 49-50) by frying (column 6, line 5). Regarding claim 22, it is noted that since Hilton et al. teaches that the uncooked processed potatoes are shaped and cut formed into potato slices, for making potato chips. It is noted that this reads on the claimed limitation of the "processed food is potato slices." Regarding claim 23, Hilton et al. teach wherein the microorganism is yeast, as discussed with

respect to claim 10. Claim 24 is rejected for the reasons given with respect to claim 12. Claim 25 is rejected for the reasons given with respect to claim 16.

- **Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claims 1-2, 8-10, 13-14 and 17-19, above and in further view of Greup et al. (US 4348417).**

Claim 6 recites that the uncooked processed food comprises potatoes and comprises frying the uncooked processed food without drying the uncooked processed food, after fermenting and before drying and thus differs from Hilton et al. in this regard.

It is noted that Hilton et al. teaches the step of drying solely for the purpose of producing dehydrated potato flakes that are subsequently shaped into potato chips and French fries, for instance. The secondary function of drying is to achieve a desired moisture content for achieving the desired organoleptic properties when frying. Additionally, since Hilton et al. is making dehydrated flakes, the added purpose of drying is to make the dehydrated flakes that are subsequently packaged and can be reconstituted using water and then shaped into potato chips and French fries, for instance (column 6, lines 36-40 and lines 46-50). Therefore, whether the ordinarily skilled artisan chose to forgo drying the product after fermentation but before frying would have been an obvious result effective variable routinely determinable by experimentation, depending on the particular organoleptic properties desired to be imparted to the uncooked processed potato when frying and depending on whether the

treated potato product was intended to be packaged in a dehydrated state or immediately cooked. Nevertheless, Greup teaches a similar product as that taught by Hilton et al. in that both Greup and Hilton teach that the fermented potato product can be formed into a particular shape and subsequently cooked by frying or baking, for instance (column 2, lines 6-17). To therefore employ the conventional step of frying after fermenting without drying would have been obvious to one having ordinary skill in the art if it was desired to immediately shape and cook the potato products as opposed to storing in a dehydrated state.

- **Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claims 1-2, 8-10, 13-14 and 17-19, above, and in further view of Gimmler (US 6001409), Sunderland (US 5558898) and in further view of Baldwin (US 2744017), Mottram et al. ("Acrylamide is formed in the Maillard Reaction") and Elder et al. (US 20040058054).**

Claim 7 recites the limitations that the uncooked processed food is selected from the group consisting of cereal meals and corn meals and that the uncooked processed food is dried after fermenting and before the step of cooking and wherein the cooking step is baking.

It is noted that Gimmler teaches that a conventional process for making corn meal based products, such as tortilla chips is to form a mass which is shaped, dried and subsequently cooked (column 16, lines 1-41). In this case, Gimmler teaches toasting as the drying step since it has also been used to reduce the moisture content. Gimmler

teaches using corn meal and corn flour (column 8, line 62 to column 9, line 35).

Additionally, Sunderland teaches that masa flour, which is made using corn has been conventionally used to make tortilla chips and taco shells.(column 1, lines 22-25) and further comprises reducing sugars (column 6, footnote 3, below the table).

Nevertheless, since Hilton et al. similarly teaches that the final treated product can be shaped into a particular shape before cooking and also teaches using fermentation to reduce the levels of reducing sugars in the food product so as to reduce the browning of the cooked product, to substitute one conventional starch based food comprising reducing sugars for another conventional starch based food also comprising reducing sugars, for the purpose of controlling/reducing the browning in the other starch based product would have been an obvious matter of choice and/or design.

It is noted that the art has well established that browning results from this reaction process, as further evidenced by Baldwin, on column 1, lines 32-34. Baldwin even further recognized on column 1, lines 39-45 that fermentation to consume the reducing sugars was a method for reducing this browning reaction. Therefore, by removing one of the reactants in the Maillard browning reaction, such as the reducing sugars, one would also have been reducing the ability of the reaction to produce acrylamide. Additionally, the art already recognized that the Maillard reaction which has already been linked to browning is also responsible for the formation of acrylamide. Mottram et al. has been relied on as further evidence that the Maillard reaction, which the art has recognized results in the browning of food products, also has been recognized as the mechanism for forming acrylamide. It is even further noted that Elder

et al. teaches that the art had also recognized various starch based foods comprise the components that result in browning, including corn products, potato chips and crackers (paragraph 0004, 0007-0009). Although Elder appears to employ a different process for reducing acrylamide formation, Elder also teaches a fermentation process (paragraph 0011) but has been primarily relied on to teach the particular type of products that can form acrylamide as a result of the amino acid and reducing sugar content therein. To therefore reduce one of the reactants in the Maillard reaction by fermentation to reduce browning when cooking, as taught by Hilton et al., for instance, one would also be reducing the potential for the formation of acrylamide when cooking the product. Once the art recognized reducing browning by fermenting to lower the reducing sugar content, the particular food comprising reducing sugars that was fermented for this same purpose would have been obvious to one having ordinary skill in the art, for the same purpose of controlling the browning of the product when cooking.

- **Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claims 1-2, 8-10, 13-14 and 17-19, above, and in further view of Goering et al. (US 4428967).**

Claim 13 recites recycling the yeast between batches of the uncooked processed food. The references, as applied to claims 1-2, 8-10, 13-14 and 17-19 already teach that it was conventional to recycle yeast. Nevertheless, Goering et al. teach that yeast that has been recovered from a fermentation can then be recycled to the fermenters, which would have increased the yeast populations and then would shorten the

fermentation time and therefore reduce fermentation volume and production costs (column 13, lines 23-34). It is noted that Goering et al. is similar to the prior art in that it teaches using fermentation microorganisms such as yeast. To therefore modify the combination and reuse yeast would have been obvious to one having ordinary skill in the art, for the purpose of reducing the fermentation time to achieve the similar fermentation rates.

NEW GROUND(S) OF REJECTION

- **Claims 26-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claims 1-2, 8-10, 13-14 and 17-19, above, and in further view of Amrein ("Potential of Acrylamide Formation, Sugars, and Free Asparagine in Potatoes: A comparison of Cultivars and Farming Systems").**

It is noted that applicant filed provisional application 60/424,151 on November 6, 2002 and claims priority to this application. It is noted, however that the limitation of the particular amounts of the fructose and glucose, as disclosed in claims 26-31 is not supported in the provisional application. As such the effective filing date for these limitations is October 6, 2003.

Claims 26-31 are rejected for the reasons given with respect to claim 1. These claims further differ from claim 1 in the particular recitation of the amount of fructose, glucose and sucrose in the uncooked processed food.

Amrein teaches that potatoes have, on average have 684 mg of glucose and 435 mg of fructose and 996 mg of sucrose per kilogram of potatoes (See table 1). Each of these is less than 0.1%. and to therefore employ particular conventional potatoes which have the claimed range of glucose, fructose and sucrose would have been an obvious matter of choice and/or design depending on the amount of browning desired as well as the type of flavor imparted to the food product.

Regarding claims 28 and 29, these limitations were similarly to those of claim 1 and thus those limitations of claims 28 and 29 are rejected for the reasons given with respect to claim 1. Regarding the limitations to claims 26, 27, 28, 29, 30 and 31, of the particular amount of glucose, fructose, sucrose, maltose and lactose levels in the potato prior to fermentation being less than 0.1 wt%, it is noted that Amrein has only been relied on as evidence of the fact that potatoes such as those used by Amrein have reducing sugar levels within applicants' claimed range. Although applicant may have conceived and reduced to practice the claimed invention prior to the publication date of Amrein, those cultivars of potatoes taught by Amrein were not invented by Amrein but were merely studied by Amrein. For instance, on page 5558 right column, Amrein discusses other references which also disclose that the levels of reducing sugars vary across various potato cultivates. The disclosure relied on in the Amrein reference simply evidences the fact that various cultivars of potatoes have reducing sugar content within applicant's claimed range. That is, in certain circumstances, references cited to show a universal fact need not be available as prior art before applicant's filing date. (See MPEP 2124). Additionally, it is noted that applicant is not the inventor of the

particular cultivar that is employed, as disclosed in applicant's specification (Wisconsin 123). Therefore, once the art recognized that the sugars in the potatoes can be reduced and thus the browning upon frying can be controlled as a result of a fermentation using microorganisms such as yeast, the particular conventional potatoes that one chose to treat would therefore have been an obvious matter of choice and/or design.

Regarding claims 32-34, which recite the particular percentage reduction in acrylamide, it is noted that the Maillard reaction which is the reaction of reducing sugars with amino acids present in the food that react when heated to a particular degree, has been a well known reaction in the art, which results in the browning of the heated food products by the reaction of reducing sugars with amino acids under a particular degree of heat. The art has well established that browning results from this reaction process, as further evidenced by Baldwin, on column 1, lines 32-34. Baldwin even further recognized on column 1, lines 39-45 that fermentation to consume the reducing sugars was a method for reducing this browning reaction. To therefore employ fermentation to consume the reducing sugars present in the food product, for the purpose of preventing or reducing the Maillard reaction has been conventional in the art. Since the art recognized that the Maillard reaction has also been linked to the formation of acrylamide, to therefore consume one of the reactants in the Maillard reaction would also have resulted in the reduction in the formation of acrylamide. In any case, Mottram et al. has been relied on as further evidence that the Maillard reaction, which the art has recognized results in the browning of food products, also has been recognized as the

mechanism for forming acrylamide. Additionally, Elder et al. teaches that the art had also recognized various starch based foods comprise the components that result in browning, including corn products, potato chips and crackers (paragraph 0004, 0007-0009). Although Elder appears to employ a different process for reducing acrylamide formation, Elder also teaches a fermentation process (paragraph 0011) but has been primarily relied on to teach the particular type of products that can form acrylamide as a result of the amino acid and reducing sugar content therein. Therefore, once the art recognized that the Maillard reaction also results in acrylamide formation and once the art recognized consuming one of the reactants in the Maillard reaction to prevent the reaction from occurring, such as by using fermentation to consume the reducing sugars for reduce the Maillard reaction browning, the particular degree of reduction of the Maillard reaction/browning/acrylamide formation, as a result of the degree that one of the reactants can be removed would have been an obvious result effective variable, routinely optimized by experimentation.

(10) Response to Argument

- On page 23 of the Appeal Brief, Appellant urges that "the rationales offered in support of the various proposed modifications in the rejections are unrelated to the problem solved by Hilton and do not take into account the inconsistencies and negative consequences that would follow from the proposed modification." Appellants further urge that "the obviousness rejections stem from the identification of a reference (i.e. Hilton) that is tangentially related to the pending claims based on its use of a potato fermentation process. The Office Action then proceeds to assert that every difference between Hilton and the recited processes is obvious because the claimed element has at least some utility in at least some context. However, there is no regard for the final process that is asserted to result from the applied

references, and there is no consideration how the proposed modifications fit together as a cohesive process that the skilled artisan would have in fact found obvious to perform."

These urgings have been considered but are not persuasive. It is noted that Hilton essentially performs the same process as that of appellant. That is, both Hilton and appellant are fermenting a raw uncooked processed food that comprises asparagine and sugars, such as potatoes. Both Hilton and appellant are subsequently fermenting the potatoes for the purpose of lowering the reducing sugar content. As discussed in the rejections above, although Hilton et al. does not explicitly use the phrase "reducing acrylamide" it is noted that both Hilton and appellants are performing the same step of employing fermentation for lowering the amount of reducing sugars present in the food, such that when thermally processing to make a baked or fried food product, the levels of acrylamide would have been reduced. Furthermore, is noted that the Maillard reaction (which is the reaction that Hilton et al. thus prevents) and its reactants have been well known (i.e. asparagine and reducing sugars) and are inherently present in potato products. By reducing one of the reactants, such as the reducing sugars through fermentation, Hilton et al. intrinsically would have reduced the formation of acrylamide. This would further have been obvious to the ordinarily skilled artisan since Hilton et al. teach that upon frying the potato product has reduced browning and since the Maillard reaction, which results in the browning during frying would have been limited as a result of lowering the amount of one of the reactants. Mottram and Elder et al. further evidence that it has been well established that the reaction of asparagine and reducing sugars results in the formation of acrylamide. Thus, by reducing one of the reactants,

would have been obvious to have reduced the reaction that would have produced acrylamide (and thus the formation of acrylamide would have been reduced).

Furthermore, the differences in appellant's claimed steps and that of Hilton would further have been obvious to the ordinarily skilled artisan, in view of the secondary references. For instance, regarding the use of yeast extract for fermentation by the microorganism, the art recognized that yeast extract serves the function of providing the nutritional requirements to the microorganism so that the microorganisms grow and thus further facilitate fermentation of the food product. Thus, in view of this well known concept in the art, to employ a yeast extract would have been an obvious result effective variable, routinely determined by experimentation for the purpose of controlling the growth of the microorganism and thus the rate of fermentation of the products. Regarding the use of a neutralizing, alkali metal hydroxide or food-grade acid, it is noted that the art has recognized that the growth of microorganism and thus the rate of fermentation are dependent on a variety of factors, such as the pH of the medium in which the microorganisms have been placed. This has been evidenced by, at least, the Catalogue of Bacteria and Bacteriophages, as discussed in the rejection above. Even further, Hopkins, Young and Pinnegar further evidence a particular pH environment when employing particular microorganism for fermentation. This also appears to be appellant's reason for employing a neutralizing agent - to control the pH of the aqueous medium. Therefore, to employ additives such as neutralizing agents would have been obvious to one having ordinary skill in the art, for their art recognized and appellant's intended function.

Regarding the use of a strainer, it is noted that the art has recognized employing a strainer when employing a recirculation stream for the aqueous medium, for example. The strainer, would thus have kept the product within the fermentation vessel, while being able to recirculated the medium employed for fermentation, such that the rate of fermentation can be increased, as discussed above with respect to Hopkins, Young and Pinnegar. Thus, the advantages of employing a strainer and a recirculating stream have also been recognized in the art. To thus employ a recirculating stream and strainer when fermenting the product taught by Hilton et al. would thus also have been obvious for the purpose of increasing / controlling the rate of fermentation.

Regarding the step of drying or cooking without drying the potato product, it is noted that the drying results in the formation of dehydrated potato flakes (depending on the particular amount of drying employed) and can control the degree of moisture for the purpose of achieving the desired organoleptic properties when frying. Nevertheless, Greup teaches a similar product to Hilton et al. in that the potato product is fermented and then fried, without a drying step (column 2, lines 6-17). Therefore, whether one chose to dry the fermented potato products prior to frying would have been an obvious result effective variable to one having ordinary skill in the art based on the desired final product and the properties associated with the final product.

- On pages 25-26 of the Appeal Brief, Appellant urge that "the selection of low-sugar potatoes having less than 0.1 wt% glucose and/or less than 0.1 wt% fructose as a starting material in the modified process is inconsistent with the subsequent fermentation step, which only requires reduction to less than 0.2 wt% to avoid undesirable browning." Appellant further urges that the addition of excess water to form an aqueous mixture in the modified process is inconsistent with the subsequent

omission of the drying step that would otherwise form dried potato solids capable of dough formation and frying." Thus, appellant urges that the approach followed by the Office Action is a simple retracing of the path of the inventor using the appellant's disclosure without regard for the number and complexity of alternatives along the path - a hallmark of impermissible hindsight."

These arguments have been considered but are not persuasive. Regarding the particular amount of sugars such as fructose and glucose, the claims which recite these limitations do not exclude the particular amounts of the other reducing sugars. For instance, claims 26 and 27 recite "comprises less than 0.1 wt% glucose," and "comprises less than 0.1 wt% fructose." Thus, although these claims limit one reducing sugar, they do not limit the particular amount of any other reducing sugars present. Claims 28 and 29 are similar in this regard. Claim 30 adds that the uncooked processed food comprises less than 0.1 wt% fructose (in addition to less than 0.1 wt% glucose). Nevertheless, these claims still leave open the particular amounts of reducing sugars since they are "comprising" limitations. Even further, it is noted that Hilton even teaches that the "fermented solids contain less than... about 0.2 weight percent of reducing sugar." Appellant's claims are directed to the amount of reducing sugars present prior to fermentation, while Hilton et al. essentially teaches that after fermentation, the reducing sugars should be less than 0.2 weight percent, for controlling browning (i.e. the Maillard reaction), which thus would control the formation of acrylamide. Furthermore, as evidenced by Amrein, appellant is not the first to employ potatoes that have low reducing sugar content. Therefore, to modify Hilton and employ a potato that has low reducing sugar content would have been an obvious matter of choice and/or design.

- On pages 26-27 of the Appeal Brief, Appellant urges that "Even through Hilton describes its fermentation medium as 'aqueous in nature' (Hilton, 3:35-36), it is apparent from the context of Hilton that the 'aqueous' label is based on the high natural water content of the potatoes in general. However, the high natural water content is bound within the potatoes and incapable of forming the recited aqueous medium." Thus appellant urges that "There is no reason, however, that the skilled artisan would have added the additional water to Hilton's pre-fermentation mixture. Hilton's pre-fermentation matrix is a mixture of mashed potatoes with sufficient water to already allow complete mixing and contact with the minute amount of yeast slurry. Moreover, the addition of excess water is completely counterproductive to Hilton's drying step to form dried flakes suitable for subsequent dough formation and frying. IN particular, the addition of excess water would not be expected to provide a benefit during the fermentation step, yet it would substantially increase the energy requirement for subsequent drying of the fermented potatoes. "

This argument has been considered but is not persuasive. It is noted that Hilton et al. already teach that the food is combined with an "aqueous medium" (see column 7, lines 26-29). Furthermore, it is noted that the claims only recite the addition of uncooked processed food to the aqueous medium - and Hilton teaches this step. It is noted, that it is not clear as to what type of fluidity would have resulted from the addition of 100 grams of potatoes to 500 mL of water, as disclosed in applicant's specification and applicant's figures 1, 4 and 5, for instance. In any case, as discussed above, it is noted that Christ et al. teaches an aqueous medium comprising a microorganism that is employed for fermenting the material within the fermentation vessel. Hilton et al. teaches the use of an aqueous medium which is added to the uncooked, processed potatoes, for the purpose of fermenting the potatoes. Nevertheless, the references to Christ, Green, Hopkins, Young and Pinnegar further teach the advantages of being able to recirculated an aqueous medium that has been used for fermentation - for the

advantages of improving the fermentation rate. Additionally, Christ et al. teaches employing an aqueous medium comprising a microorganism that has been employed for fermenting the food within the vessel, wherein the aqueous medium can be recirculated so as to ensure complete contact between the product and the fermentation medium. Therefore, to be able to recirculate the aqueous fermentation medium would have been obvious to one having ordinary skill in the art for the known advantages of improving the fermentation rate and ensuring complete contact between the aqueous medium and the product to be fermented. It is further noted that regardless of the particular amount of the aqueous medium employed by Hilton et al. that the purpose of the medium is to remove the reducing sugar content in the potatoes. Therefore, one having ordinary skill in the art would have been reasonably apprised of amounts of an aqueous fermentation medium that would be required to achieve the desired reduction in the reducing sugar content. Nevertheless, in view of Christ et al. and the references to Hopkins, Young and Pinnegar, who teach the added advantage of recirculating a fermentation medium is to improve the fermentation rate, it would have been obvious to the ordinary skill artisan to employ an amount of the fermentation medium that can recirculate, for achieving the two-fold advantage of complete contact of the product with the fermentation medium and improved fermentation.

It is not clear as to why employing an aqueous medium that can be recirculated would have been counterproductive to Hilton's drying step, since recirculation of the aqueous medium, as discussed above, can provide the advantage of improved

fermentation rates and assurance that all parts of the food product can be adequately contacted with the fermentation medium.

- On pages 27-28 of the Appeal Brief, Appellant urges that "Hilton, however, uses potatoes having an initially high reducing sugar content of at least 1 wt% or more commonly ranging from about 2 wt% to 3 wt%. Thus where would have been no reason to add a second nutrient source (i.e. the yeast extract) in addition to the pre-existing nutrient source (i.e. natural sugar content of potatoes). Specifically, within the context of Hilton and the other applied references, the fermentation need only take place as long as available sugars are present. Further, the addition of yeast extract to Hilton could have been counterproductive, possibly limiting the rate of sugar reduction by Hilton's yeast due to the presence of a competing nutrient source (i.e., the yeast extract in addition to the natural reducing sugar content.). Thus there is no reason to modify the applied combination of references to arrive at the recited addition of yeast extract." Appellant further urges that "the applied references generally disclose the use of a yeast extract in combination with outer nutrients, in particular sugars. The addition of supplemental sugar sources (e.g. outside of the natural sugar content of the raw food and the yeast extract) is contrary to the recitation that no sugars are added to the processed food. The obviousness rejections provide no reason why the skilled artisan would have selectively ignored portions of the secondary references to incorporate a yeast extract without a supplemental nutrient source."

This argument has been considered but is not persuasive. It is only Appellant's opinion that the use of yeast extract would have been counterproductive. It is noted that although Hilton does not recite using yeast extract, the use of yeast extract for facilitating the growth of microorganisms for fermentation has been a conventional expedient for its art recognized and appellant's intended function. It is noted that the references teach that yeast requires a medium that comprises nutrients, for the purpose of facilitating growth of the microorganism, such as yeast. Thus, the art has recognized employing a nutrient composition such as yeast extract for the purpose of facilitating growth of both yeasts and lactic acid bacteria, as evidenced by the mediums taught by

The Catalogue of Bacteria & Bacteriophages. Furthermore, it is noted that additional sugars and nutrients present through the use of yeast extract could also have facilitated or even increased the rate of growth of the microorganisms, thus improving the rate of fermentation. Therefore, to employ yeast extract would have been an obvious result effective variable, routinely determined by experimentation, for the purpose of achieving the requisite degree of yeast growth commensurate with the desired rate of fermentation.

Although it is not clear, *if* Hilton et al indicated that yeast extract was not necessary as a nutrient for the yeast, due to the reducing sugars available in the potatoes, the use of yeast extract would still have been a function of the particular reducing sugar content in the product to be fermented and the degree of yeast growth desired. Therefore, if the product to be fermented did not have the requisite amount of reducing sugars it would have been obvious to one having ordinary skill in the art to have employed yeast extract, for the purpose of ensuring that the fermentation progresses.

It is noted that the declaration filed September 15, 2008, also indicates in paragraph 0012 on page 5, that appellant's yeast extract also comprises carbohydrates and sugars. Therefore, to modify the combination the use of yeast extract would thus have been obvious to one having ordinary skill in the art for the purpose of providing the adequate degree of growth of the microorganism, and thus facilitating the desired degree of fermentation.

- On page 29 of the Appeal Brief, Appellant urges that "it is not possible to wash the fermented food product of Hilton, because Hilton uses blanched mashed potatoes. Specifically, the fermented potato matrix of Hilton will not permit washing because of its mashed, dough-like consistency. In contrast, the spongy curd matrix of Sokolsky is amenable to washing because of its porous nature, which allows a washing fluid to flow through the matrix with a high surface contact area. Thus, even assuming that the skilled artisan would be motivated to incorporate the washing step of Sokolsky into the method of Hilton, there is no expectation that such a washing step would be effective or even possible.

This argument has been considered but is not persuasive. It is only appellant's opinion that washing of the fermented product of Hilton et al. would not have been feasible. In any case, it is noted that Hilton et al. teaches that the product is a potato mash and thus does not appear to be dough in the sense of a malleable "ball" of dough (such as in making bread), especially since, when drying the mashed potato dough is made into potato flakes. In any case, since fermentation is performed by agitation, and since the potatoes are also a majority water, there would have been a reasonable expectation of success of washing the fermented food, especially since Sokolsky teaches that fermentation can provide an undesirable flavor which can be mitigated through a washing step. It is further noted that the claims do not recite how the processed food has been washed and thus does not limit methods such as rinsing in a bowl of water and then straining the water from the potato mixture, for instance, for the purpose of removing the yeast flavor.

- Further on page 20 of the Appeal Brief, Appellant urges that "an outlet strainer would have been ineffective or counter-productive in the apparatus of Hilton for the reasons given above with respect to washing. Namely, the mashed potato matrix of Hilton would likely either plug the outlet strainer or be forced through the strainer along with the washing fluid (i.e. depending on the size of the strainer orifices and

the flow rate of the washing fluid). In contrast, Green and Christ relate to pickle and sauerkraut processes (respectively) that are amendable to the use of a strainer because of the larger, cohesive solid structure of their fermented solids (i.e. as compared to the small, mashed potato solids). IN any event, an outlet strainer added to the apparatus of Hilton would not have the desired effect of retaining the fermented food product while permitting the washing fluid to pass through the outlet strainer."

These urgings have been considered but are not persuasive, for the reasons given above with respect to appellant's urgings regarding the washing step. That is, it is only appellant's opinion that the use of a strainer would not have been effective in retaining the potato mass while allowing for circulation of the aqueous medium. Furthermore, claims 1 and 20 do not limit the particular type of food product. Also, it is noted that the potato mass taught by Hilton et al. would still, nonetheless, have had a degree of porosity (especially since the mixture would have been an aqueous mixture in view of the fact that potatoes contain a majority of water) and thus there would have been a reasonable expectation of success of straining water through a porous material such as potato dough, especially since Green teaches "finely divided vegetable pieces" and since Hilton et al's product is also finely divided vegetable pieces.

- On pages 30-31 of the Appeal Brief, Appellant urges that "acrylamide reduction at pH values of 4 and 5 is substantially higher than at pH values from 6 to 8. The benefit of using a lower pH was demonstrated to be applicable to different types of microorganisms, including yeast and bacterial cells." Appellant further urges that "superior acrylamide reduction at lower pH values was unexpected, inasmuch as the optimal pH for microbial growth of the microorganisms tested was higher: pH of 6 to 7." Appellant further urges that even if some microorganisms are capable of surviving at a lower pH, the lower pH is generally inhibitory for bacterial growth and would not have been expected to result in superior acrylamide reduction. This indicates that a low pH has an independent effect on the reduction of acrylamide regardless of the presence and/or disappearance of acrylamide precursors, further

illustrating that acrylamide formation cannot be fully explained by the Maillard reaction, and that some other mechanism probably operates to reduce acrylamide.

This urging has been considered but is not persuasive. It is noted however, that Hagiwara teaches that lactic acid fermentation is successful when the pH of the environment is about 4 to 6. Furthermore, it is noted that Bechtle also teaches fermentation using lactic acid bacteria such as lactobacillus, Streptococcus and Leuconostoc (column 5, lines 60-64) and further teach that the fermentation culture at the start of the fermentation medium has been known to be between 4 and 5, such as at 4.9 (Column 7, line 43). Additionally, "Fermented Fruits and Vegetables," teaches that it has been well known in the art to use lactic acid bacteria for fermentation in the production of sauerkraut (See page 6 of 13, See Section 5.6.2). Baldwin has also been cited to teach that it has been known in the art to use lactic acid bacteria for the purpose of reducing "Maillard Type" browning (column 1, lines 27-35 and lines 39-49) - which the art has recognized results in the formation of acrylamide (see Mottram and Elder et al. on paragraph 0011). Baldwin teaches in the cited column and lines that fermentation using lactic acid bacteria removes naturally occurring glucose. Therefore, these teachings teach one having ordinary skill in the art that lactic acid fermentation for food products employs a pH within appellant's claimed range for the purpose of employing lactic acid fermentation for lowering the reducing sugar content of a food product. Thus, the art recognized fermentation for removal of reducing sugars and for reducing acrylamide formation (see Elder et al.). Therefore, to modify the particular pH for the purpose of achieving maximum fermentation and consumption of reducing sugars would

have been an obvious result effective variable, routinely determined by experimentation based on the particular microorganism employed and the particular conditions which would have maximized fermentation of the product.

- On page 31 of the Appeal Brief, appellant urges regarding the references used to teach the pH values for the fermentation, that these references are out of context with respect to the Hilton reference being modified since Hagiwara is directed to tear grass fermentation, "Lactic Acid Bacteria" is related to fermentation in yogurt, cheese, sauerkraut and sausage, "How to Restart a Stuck Fermentation" is directed to fermentation of grape juice, And thus there is no reasons that one would have incorporated the teachings of these reference to Hilton to arrive at the claimed method.

This argument has been considered but is not persuasive, since these references are all related to fermentation employing lactic acid. Although they disclose a broad variety of products that are fermented, regardless of the product, the references nonetheless, teach that the pH when employing lactic acid bacteria, for instance, should be within the claimed range. Since Baldwin teaches lactic acid fermentation to prevent the Maillard reaction by removing glucose, to thus employ a pH of 4, for instance, when removing the reducing sugars in potato for the same purpose of reducing the Maillard reaction and thus browning and the formation of acrylamide would have been an obvious result effective variable, routinely optimized by experimentation for the purpose of inhibiting the Maillard reaction, browning and thus the formation of acrylamide.

- On pages 31-32 of the Appeal Brief, Appellant urges that identification of the claimed pH range would not have been a matter of routine optimization because only result effective variable can be optimized, and a particular parameter must be recognized as a result-effective variable before the determination of an optimum or workable

range of said variables might be characterized as routine experimentation. Appellant further urges that even assuming the desirability of limiting acrylamide, there is nothing in the applied references suggesting that the pH is a result effective variable for acrylamide reduction. Thus, appellant urges that the ordinarily skilled artisan would not have been able to identify the lower recited pH range as a simple matter of routine optimization.

This argument has been considered but is not persuasive. It is noted that the references relied on teach that when employing a fermentation that uses lactic acid bacterial, that it has been advantageous to employ a pH within appellant's claimed range, for the purpose of allowing the fermentation to proceed. Therefore, the optimization would have been related to the ability of the microorganism to effectively carry out the fermentation. It is noted that Baldwin already recognized that the Maillard reaction browning reaction, which Mottram and Elder teach results in the formation of acrylamide. Elder even teaches that acrylamide can be reduced using fermentation (paragraph 0011). Since Baldwin already teaches reducing the Maillard reaction by consumption of reducing sugars through lactic acid fermentation, and since the art already teaches employing lactic acid fermentation for foods by employing a pH within the claimed range, to thus employ the claimed range would have been obvious to one having ordinary skill in the art, for the purpose of facilitating fermentation to consume reducing sugars. It is further noted that example 5 of appellant's specification also indicates that the rate of microbial fermentation is directly affected by the pH of the fermentation medium. This is commensurate with that which has been known in the art. That is, controlling the pH affects the rate of fermentation.

- On pages 32-33 of the Appeal Brief, Appellant urges that there is no reason to omit the drying step of Hilton, whether based on routine optimization, [the reference to] Greup, or otherwise. Hilton's drying step is not simply a means to achieve any desired moisture level; rather the drying step is performed to achieve "highly or extensively dehydrated" potato solids. The purpose of Hilton is to provide a dehydrated potato solids product that can be stably stored for several months without degradation and that can be distributed over a wide geographical area. Thus, the rejection's proposed omission of the drying step would render the primary Hilton process unsatisfactory for its intended purpose of providing stable, dehydrated potato solids that have favorable browning characteristics." Appellant further urges that "even if the skilled artisan were to omit the extensive dehydration process of Hilton, the skilled artisan would still need to dry the highly hydrated potato solids used for fermentation to arrive at an intermediate moisture content suitable for dough formation and shaping. IN this case, the resulting process would still include a drying step and the recited claim limitation would not be met, Precluding a prima facie conclusion of obviousness. "

These urgings have been considered but are not persuasive. It is noted that Greup clearly teaches a similar product as that taught by Hilton et al. in that both Greup and Hilton teach that the fermented potato product can be formed into a particular shape and subsequently cooked by frying or baking, for instance (see Greup column 2, lines 6-17). To therefore employ the conventional step of frying after fermenting without drying would have been obvious to one having ordinary skill in the art if it was desired to immediately shape and cook the potato products as opposed to storing in a dehydrated state. Appellant's urging regarding a reduction of moisture being a necessity has been considered but is not persuasive, in view of the teachings that it has been conventional to fry a product after fermentation, as evidenced by Greup. Furthermore, it is noted that one purpose of Hilton et al.'s process is to reduce browning by lowering the reducing sugar content, which the art has recognized resulted in the formation of acrylamide via the Maillard reaction. In view of Greup who teaches manipulation of the fermented

product for immediate cooking, to thus modify Hilton et al. and shape and fry without drying would thus have been an obvious matter of choice and/or design.

- On pages 33-34 of the Appeal Brief, Appellant urges that "there is no reason that the skilled artisan would modify the process of Hilton to simultaneously begin its process with low-sugar potatoes and still ferment the low-sugar potatoes. If the skilled artisan had selected low-sugar potatoes meeting the recited fructose/glucose content, the skilled artisan would have omitted Hilton's fermentation step, inasmuch as the recited saccharide contents are already below Hilton's most preferred final reducing sugar content of about 0.2 wt% or less.

This urging has been considered but is not persuasive. It is noted that Hilton et al. teaches that fermentation to lower the reducing sugar content has been effective in reducing the browning of the cooked product. Additionally, the art has recognized, as evidenced by Mottram and Elder et al. teach that the Maillard reaction results in the formation of acrylamide, while Baldwin teaches that the Maillard reaction results in browning. Therefore, once the art recognized reducing browning by lowering the reducing sugar content, to thus employ a fermentation process to lower the reducing sugar content. Furthermore, it is noted that the regardless of the initial reducing sugar content, if one desired to lower the browning of a particular conventional type of potato, Hilton et al. teaches employing fermentation, which would consume the reducing sugars of the potato. Therefore, the particular conventional potato that one employed would have been an obvious matter of choice and/or design. It is also noted, as discussed above, that claims 26-31 recite an open group of reducing sugar constituents and thus does not exclude other reducing sugars and their amounts.

- On pages 34-35 of the Appeal Brief, appellant urges that the skilled artisan could not have expected to have been able to achieve the particularly recited reduction levels by simply fermenting a raw uncooked processed food comprising asparagine and sugars under any desired fermentation conditions. Appellant further urges that many selections of fermentation conditions led to an acrylamide reduction in the range of about 20-29.

This urging has been considered but is not persuasive. As discussed above, the art has already recognized that lowering the reducing sugar content can reduce/retard the Maillard reaction, which the art has recognized results in the formation of acrylamide (see Mottram, Elder et al. and Baldwin). To lower the reducing sugar content, the art teaches employing fermentation, as evidenced by Hilton and Baldwin, for instance. It has been well recognized in the art that the conditions of the fermentation are dependent on the particular microorganisms employed. Nevertheless, the art relied on teaches the claimed fermentation rates using particular microorganisms, such as lactic acid bacteria. Therefore, once the art recognized that the Maillard reaction also results in acrylamide formation and once the art recognized consuming one of the reactants in the Maillard reaction to prevent the reaction from occurring, such as by using fermentation to consume the reducing sugars for reduce the Maillard reaction browning, the particular degree of reduction of the Maillard reaction/browning/acrylamide formation, as a result of the degree that one of the reactants can be removed would have been an obvious result effective variable, routinely optimized by experimentation.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

This examiner's answer contains a new ground of rejection set forth in section (9) above. Accordingly, appellant must within **TWO MONTHS** from the date of this answer exercise one of the following two options to avoid *sua sponte* **dismissal of the appeal** as to the claims subject to the new ground of rejection:

(1) **Reopen prosecution.** Request that prosecution be reopened before the primary examiner by filing a reply under 37 CFR 1.111 with or without amendment, affidavit or other evidence. Any amendment, affidavit or other evidence must be relevant to the new grounds of rejection. A request that complies with 37 CFR 41.39(b)(1) will be entered and considered. Any request that prosecution be reopened will be treated as a request to withdraw the appeal.

(2) **Maintain appeal.** Request that the appeal be maintained by filing a reply brief as set forth in 37 CFR 41.41. Such a reply brief must address each new ground of rejection as set forth in 37 CFR 41.37(c)(1)(vii) and should be in compliance with the other requirements of 37 CFR 41.37(c). If a reply brief filed pursuant to 37 CFR 41.39(b)(2) is accompanied by any amendment, affidavit or other evidence, it shall be treated as a request that prosecution be reopened before the primary examiner under 37 CFR 41.39(b)(1).

Extensions of time under 37 CFR 1.136(a) are not applicable to the TWO MONTH time period set forth above. See 37 CFR 1.136(b) for extensions of time to

reply for patent applications and 37 CFR 1.550(c) for extensions of time to reply for ex parte reexamination proceedings.

Respectfully submitted,

/Viren Thakur/

Examiner, Art Unit 1794

Conferees:

Steve Weinstein

/Steve Weinstein/

Primary Examiner, Art Unit 1794

/Gregory L Mills/

Supervisory Patent Examiner, Art Unit 1700

A Technology Center Director or designee must personally approve the new ground(s) of rejection set forth in section (9) above by signing below:

/Gregory L Mills/

Supervisory Patent Examiner, Art Unit 1700